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Parents' perspectives on ICT and how practices related to ICT are present in the classroom

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Since the beginning of the 21st century, rapid changes in technology have taken place, such as the emergence of smart phones and other handheld devices while social media, apps and other software products have become more common and a part of our daily lives. Education is also subject to change, as many countries have recently revised their curriculum to facilitate the fast-paced development. This has led to updating learning objectives and methods to meet the standards and challenges of the modern, digitalized world. Finland likewise implemented a fresh core curriculum in the autumn of 2016, which included the new concept of transversal competences. These transversal competences are skills or abilities, which are to be taught throughout all school subjects, information and communication technology being one of these competences.

Technology in education has attracted considerable attention, both scholarly and popular. However, most studies in the field of ICT related to education and school practices have only focused on teachers, students and policymakers, instead of parents. Therefore, this thesis discusses primary school (1st-6th grade) parents' perspectives considering information and communication technology (ICT). The present study aims to explore how parents define ICT and what practices they have experienced being used at their children's school. This study uses a qualitative approach. The data was collected with an open-ended questionnaire, which was sent to selected schools in the Oulu region, and resulted in 20 responses. The data was analyzed using thematic analysis.

The findings show that parents define ICT mainly as practices, skills, competences and using digital tools as well as digital literacy, digital fluency and communication, including some 21st century skills. The results indicate that parents are generally positive towards the use of ICT in the school and believe the significance of ICT skills will increase in the future, with some exceptions. The experienced school practices related to ICT varied: some parents claimed that there is little to no ICT in lessons, while others mentioned emerging technological practices or the use of online environments, games, computers and other devices as well as word processing programs for learning. The research results represent a further step towards understanding parents, how ICT is represented in schools and developing ways of collaboration between parents and teachers to help students learn digital skills.

Keywords: information and communication technology, ICT, parents, school practices, 21st century skills, transversal competence, computational thinking

Jo 2000-luvun alusta on tapahtunut nopeita teknologisia muutoksia. Esimerkiksi älypuhelimet ja muut mobiililaitteet sekä sosiaalinen media, sovellukset ja muut tietokoneohjelmistot ovat tulleet luontevaksi osaksi meidän jokapäiväistä elämäämme. Koulutus on myös murroksessa, sillä monet maat ovat uudistaneet opetussuunnitelmiaan vastatakseen kiihtyvään kehitykseen. Sen vuoksi opetustavoitteita ja -menetelmiä on päivitetty vastaamaan nykyisen, digitalisoituneen maailman standardeja ja sen mukanaan tuomia haasteita. Suomessa on myös otettu käyttöön uudistettu opetussuunnitelma syksyllä 2016, jossa esiteltiin laaja-alaisen osaamisen alueet. Laaja-alainen osaaminen kattaa taitoja, joita tulisi opetella kaikissa eri oppiaineissa, ja näistä tieto- ja viestintäteknologia on yksi näistä laaja-alaisen osaamisen alueista.

Teknologia opetuksessa ja kasvatuksessa on saanut paljon huomiota osakseen, sekä tieteellisissä että yhteiskunnallisissa yhteisöissä. Siitä huolimatta, monet opetusteknologiaan ja sen käyttöön liittyvät tutkimukset ovat keskittyneet opettajiin, oppilaisiin ja päättäjiin, eivätkä juurikaan ole tutkineet vanhempia. Näin ollen tämä pro gradu -tutkielma syvenyy alakoulun (1.-6.luokkalaisten) vanhempien käsityksiin tieto- ja viestintäteknologiasta (tvT). Tämän tutkimuksen tavoitteena on selvittää miten vanhemmat määrittelevät tvT:n ja mistä tvT:hen liittyvistä opetuskäytännöistä he ovat tietoisia tai mitä niistä he ovat kokeneet lapsensa koulussa. Tässä tutkimuksessa käytettiin kvalitatiivista lähestymistapaa. Tutkimusaineisto kerättiin avoimen sähköisen kyselynlomakkeen kautta, joka lähetettiin valittuihin kouluihin Oulun seudulla. Kyselylomakkeeseen tuli 20 vastausta. Tutkimusaineiston analysointiin käytettiin temaattista analysointia.

Tutkimustulokset osoittavat, että vanhemmat määrittelevät tvT:n pääsääntöisesti käytäntöinä, taitoina, kompetensseina, digitaalisten työkalujen käyttämisenä sekä digilukutaitona, viestimisenä ja lisäksi 2000-luvun taitoina. Lisäksi, tutkimustulokset osoittivat, että vanhemmat suhtautuvat enimmäkseen myönteisesti tvT:n käyttöön opetuksessa ja lisäksi uskovat tvT -taitojen merkityksen kasvavan entuudestaan tulevaisuudessa, muutamaa poikkeusta lukuun ottamatta. Vanhempien kuvailemissa opetuskäytännöissä oli eroja: osa vanhemmista koki, että tvT:tä oli opetuksessa vähän tai ei ollenkaan, kun taas toiset mainitsivat vasta yleistymässä olevia teknologisia käytänteitä tai virtuaalisten oppimisympäristöjen, tietokoneiden ja muiden laitteiden sekä pelien ja erinäisten ohjelmien hyödyntämisestä opetuksessa. Kaiken kaikkiaan tutkimus lisäsi tietoa ja ymmärrystä vanhempien näkökulmista tvT:hen, esitti kuinka tieto- ja viestintäteknologia on käytössä kouluissa ja ehdotti kuinka tulevaisuudessa voitaisiin kehittää tapoja tiivistää vanhempien ja opettajien välistä yhteistyötä, jotta oppilaat oppisivat hyödyntää entistä paremmin tieto- ja viestintäteknologiaa.

Avainsanat: tieto- ja viestintäteknologia, TVT, vanhemmat, koulun käytännöt, 2000-luvun taidot, laaja-alainen osaaminen, ohjelmallinen ajattelu

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1 Introduction

Technology keeps evolving and changing. It has a great impact on our society and ways of interaction. In the world we live in today, it is impossible to imagine life without a smartphone, or let alone without a computer or a functional internet service. Undeniably, there remain societies and countries without such amenities, therefore digitalization is not a reality for all quite yet. This has also led to discussions about digital divides, and if the uptake and use of technology actually leads to increased equality among students and communities (Wei & Hindman, 2011). Nonetheless, the plethora of information, communities and services online is both enabling and daunting. Practically anything one would ever want to know, can be found easily and effortlessly in one's pocket – and just in a matter of seconds. Easy access to knowledge has become a part of our daily lives, a privilege, which we take for granted.

The varying perspectives of information and communication technology (later ICT) is an understudied topic, as Pirhonen & Häkkinen (2014) have pointed out in the editorial of The Finnish Journal of Education. As their editorial points out, generally approaches to ICT are overly positive and there are less researches which take a critical or varying perspective - five years later, this still seems to be the case. Neither Computer Sciences nor ICT have been taught in the Finnish primary school (K-6) as a stand-alone school subject, unless in the form of a free-elective course. Instead, ICT skills have been integrated into a set of “transversal competences” among other school subjects, which are comparable to cross-curricular themes by nature. The main objective of transversal competences is to learn and gain certain skills and competences throughout school subjects. These transversal competences were first introduced when the Finnish Ministry of Education implemented a fresh national curriculum in the autumn of 2016. The primary aims of the curriculum were to update and revise learning goals, teaching methods and focus on the student's well-being and study motivation (Heim, 2016¹; Finnish National Agency of Education n.d). This study is most closely linked to the transversal competence of Information and Communication Technology (ICT). Moreover, it is worth mentioning that in general competence is understood quite broadly in the Nordic context. It is defined as not merely the ability to do something, but to be proficient on a deeper level. (Krumsvik 2011).

¹ Heim, J. 2016, 'Finland's Schools were once the envy of the world. Now, they're slipping.', The Washington Post https://www.washingtonpost.com/local/education/finlands-schools-were-once-the-envy-of-the-world-now-theyre-slipping/2016/12/08/dcf0f56-bd60-11e6-91ee-1addfe36cbe_story.html

There remain doubts as to whether teaching ICT solely as a transversal competence is feasible or sufficient. In October 2019, the Finnish Association of Mathematics Teachers [Matemaattisten Aineiden Opettajien Liitto, MAOL] proposed that ICT should be a compulsory school subject of its own, with a qualified teacher, to ensure that all students receive the same technological toolset and that the basics of *computer science*, *information technology* and *digital* literacy would be covered. (Portaankorva-Koivisto & Salmenoja, 2019). Given this extensive context, it is clear there is still need for research related to topics introduced in the curriculum and ICT alike.

My personal interest in this topic arises primarily from the need to broaden my own understanding as a teacher, considering ICT in and outside the classroom. Furthermore, I believe that Information and Communication Technology is both an international topic and a topic to be discussed more on a national level. There are many hopes, and fears attached to ICT: the hope of technology enabling a safer and more creative future, with children having increased awareness of the dangers, but also perhaps fear of digital addiction leading to apathy and the feeling of meaningless living and increased consumption. It is no wonder there are two ends of the spectrum of how people view ICT.

Another reason to research this matter originates from my studies. During my student exchange period in Sweden, autumn 2018, I encountered new ideas about learning digital competence (e.g. tackling copyright issues and programming). This sparked my interest to investigate ICT further. And last, but not least, as I completed my Master's School Practice in 2017, I realized that even though the school might have adequate equipment to facilitate teaching and learning with digital tools, ICT still faces many technical and especially pedagogical challenges.

2 Research Aim and Questions

This Master's thesis aims to take a broader look at the themes of technology related to educational ICT and parents. In recent years, there has been an increasing interest in Finland in the role of ICT – in society, school and homes as well. In some instances, the uptake of digital tools in schools and society is seen as to contribute to equity (Krumsvik 2011). However, so far there has been little research on how parents define and think about Information and Communication Technology in the context of school. The existing literature tends to focus more on handbooks and activity tips for parents, instead of finding out what they think about the matter (Siraj-Blatchford & Whitebread², 2003; Hardy³, 2016; Valtonen, 2011). Previous studies have mainly reported the needs and concerns of teachers, students and policy makers (Albugami & Ahmed, 2015; Holloway & Valentine, 2001). But nonetheless, there are some studies that also discuss parents, which will be viewed in the next chapter.

This study seeks to address the following research questions:

How do parents define ICT?

What are parents' perspectives on the use of ICT in the classroom?

A further objective of this research is to determine whether the emerging themes are similar to the themes emerging in the Finnish core curriculum. If those are in line, that could indicate that the themes and objectives considering ICT have been so clearly communicated by teachers that even parents are aware and know about them. Another option is that the parents are unaware of what ICT entails or what learning activities are taking place at school. The final result can also be a combination of these two alternatives.

My assumptions for the results are three-fold: 1) there are multiple ways of defining ICT, 2) ICT is commonly perceived as an important topic – ICT skills are thought to be crucial and helpful and 3) most parents want to ensure the best future for their children so their children can defend themselves and identify threats in both offline and online environments. Parents may rely on the school institution to teach the use of digital tools and assume that the school has adequate equipment to do that.

² Siraj-Blatchford, J., & Whitebread, D. (2003). Supporting ICT in the Early Years. Buckingham: McGraw-Hill Education. Retrieved from <http://search.ebscohost.com.pc124152.oulu.fi:8080/login.aspx?direct=true&db=nlebk&AN=234114&site=ehost-live>

³ Hardy, C. (2016). Autism and ICT: A Guide for Teachers and Parents. Routledge.

The structure of the study is quite straightforward. In the *Theoretical Framework*, the key concepts of the research will be defined (such as ICT, computational thinking) and previous research will be reviewed. *Methods* focuses on the research approach, participants, the process of the thematic analysis and ethical issues. *Results* presents the results of the thematic analysis. In *Discussion* the key findings of the research will be stated and discussed. Lastly, *Conclusion* serves to summarize the results and give future recommendations.

3 Theoretical Framework

The purpose of this chapter is to review the literature on Information and Communication Technology. It begins by establishing some of the main concepts of the study and then moves on to examine previous research.

3.1 Information and Communication Technology

The main emergence of Information and Communication Technology started at the beginning of the 21st century, as all kinds of digital devices and computers became more common. Hence, the need to research and explore the possibilities of this new technology also emerged (Lindstrand & Brodin, 2004). On the other hand, computers as well as computing, had been developed for decades, starting all the way from Alan Turing (1912-1954). Originally computer sciences had not been considered a skill set for every field, as they are now. Perhaps one of the largest advancements in technology took place in the beginning of the 21st century when using digital tools and technology became more than just computing, reading, “consuming” information and using different programs, but instead technology was used for networking, sharing and communicating. (Denning & Tedre, 2019.)

Zuppo (2012) states that ICT is defined differently in various fields. According to Zuppo (2012) *“[the] primary definition of information and communication technologies revolves around the devices and infrastructures that facilitate the transfer of information through digital means.”* Also Cunska & Savicka (2016) similarly state, *“(ICT) is a sum of technology tools and resources for creating, spreading, changing and managing the information.”* Therefore, it is evident that ICT is at the intersection of physical devices and certain actions such as communicating, creating or managing information.

Furthermore, Zuppo (2012) underlines four main fields, of which education is one. ICT in education focuses on 1) skills and competences, 2) devices and tools and 3) pedagogies - which are facilitated through phones, tables, and computers. All in all; *“In education, ICTs are a vehicle for teaching and learning through active application.”* (Zuppo, 2012) Together, these definitions outline that it is not sufficient to examine technology by itself, but there is also an extensive number of factors determining how it impacts our daily living and actions. These

factors range from tangible (infrastructure, devices, tools) to intangible (pedagogies, people, skills).

3.1.1 What is Computational Thinking

Tedre & Denning (2019) have extensively discussed the various aspects and history of computational thinking in their work. Their main claim is that computational thinking has been around for some time, is susceptible to change and it can be interpreted in different ways. In general, it is the next step towards the future, and a way of thinking that everyone can benefit from, regardless of which field they represent. The concept of computational thinking had already been coined in the late 1990's by Seymour Papert, who is thought of as the father of combining computing skills with education. Another key person is Jeanette Wing, who two decades later than Papert, began to promote “computational thinking for all” (Wing, 2010). Computational thinking by can be considered a skill that can be learned - which “*helps understand tech available and design software to use to our advantage (doing a job, problem-solving)*” and computing skills can “*serve a person for a lifetime*”. (Denning & Tedre, 2019.)

Denning & Tedre (2019) present three Eras of Computational Thinking, which form a basis for evaluating what kind of skills or aspects of computing or using digital tools have been emphasized at different periods in time. These eras are the following 1) digital literacy, 2) digital fluency and 3) computational thinking. Before computers and personal PC's first became available to the wider public, digital literacy was central. **Digital literacy** was characterized by using desktop applications and word processors, i.e. reading the existing technology. **Digital fluency**, which came after that, in the early 2000's is more active by nature and has a focus on capabilities, competences and skills. Lastly, **computational thinking**, which has been emerging in the last decade, is focused on designing, participating and understanding problem-solving and algorithms. Computational thinking is also a verb, which implies active doing. (Denning & Tedre, 2019.)

The Australian curriculum defines computational thinking mainly as a problem-solving technique, encompassing different strategies and techniques, by using digital technologies. (Fluck & Bower, 2015). Also Denning and Tedre (2019) agree that computational thinking is often thought to include logical thinking. Additionally, Fluck and Bower (2015) claim that humans are already somewhat dependent on technology and that computers will be even more significant for our economy and future. Yet there remain tasks in

which people outperform machines and vice versa. Some tasks which humans are good in are creative thinking and feeling compassion, for example. Computers, on the other hand, are excellent in fast calculations and doing repetitive tasks. It is essential to distinguish between those tasks and also utilize the strengths of both. Especially teachers should develop the skills and abilities needed to work with computers and to enhance computational thinking. (Fluck & Bower, 2015.)

3.1.2 ICT in the school and Finnish curriculum

Nowadays, there are many skills that are integrated into teaching ICT in schools. Some of these practices range from writing, reading and learning with devices and computers to programming, coding and the creative or active use of ICT. Physical changes in the classroom have already taken place as smart boards, document cameras and interactive video projectors have been installed into classrooms, while at the same time computer labs are occasionally replaced with laptops or tablets, which are more readily mobile. On the other hand, sometimes it can be difficult to get funding for new technology, or even if the funding is in place, it is hard to decide what kind of technology to acquire. Though, it may be worth the trouble. Fluck and Bower (2015) determine that for today's students multimedia and visual approaches can be more motivating and effective than text-based approaches. Also creating meaningful and attractive experimental environments can be beneficial for learning. (Fluck & Bower, 2015.) Denning & Tedre (2019) suggest Computation Thinking could be one of the next core skills learned in school, taking its place among the "three R's": Reading, writing and arithmetic. Wing (2010) similarly claims that "*Computational thinking is the new literacy of the 21st Century. It enables you to bend computation to your needs*".

The current Finnish national curriculum was implemented in the autumn of 2016. In general, the Finnish curriculum is a set of broader guidelines instead of being a strict rulebook. Due to this fact, schools and municipalities must create their own, more specific curriculum, based on the national curriculum. This local curriculum helps teachers plan their lessons and long-term teaching accordingly. What was novel in the 2016 curriculum, was the implementing of transversal competences. These transversal competences are skills, abilities or attributes, which are to be implemented in the teaching of all school subjects. One of these seven competences in the curriculum are ICT skills.

ICT skills are divided into four main points of development and learning in the curriculum

“1) students are guided to understand the main principles of information and communication technology, how to use that technology and furthermore, they are encouraged to develop in the practical ICT skills by creating and producing their own works.

2) Students are encouraged to use information and communication technology in a responsible, safe and ergonomic fashion.

3) Students are taught to use information and communication technology for data management and in inquiry-based and creative working.

4) Students gain experience and practice using ICT in communicating and networking”

(Finnish National Board of Education, 2015 p. 23)

Furthermore, the student should have the opportunity to be actively engaged and have the tools to find a way of learning which is suitable for themselves. Also finding motivation for learning should be emphasized. Digital tools offer many opportunities for visualizing one's thoughts and ideas and therefore they also help develop cognitive skills and enhance learning. (Finnish National Board of Education, 2015 p. 23)

In Finnish terminology the corresponding term for Information and Communication Technology [fin. Tieto- ja viestintäteknologia, TVT] is not yet quite established as a widely known concept. Likewise, computational thinking can be translated into Finnish in several ways e.g. [fin. algoritminen ajattelu, koneellinen ajattelu]. It is important to define concepts, which are comprehensible and similarly understandable.

3.1.3 Parents role in education and the future of schools

It is essential to examine how parents are situated in educational issues, whether they are considered active players - or passive bystanders. Epstein (2009) differentiates between 'parent involvement' and 'school and family partnerships'. The former is more about what action the parents take themselves, while the latter has a focus on the partnership. Establishing a partnership emphasizes schools and families working together collaboratively and actively as equals. Furthermore, Epstein (2009) has formed a framework of six types of involvement - which could also be seen as actions towards a better partnership and a successful school. This framework is often used when examining the role of parents in relation to the school, and it is briefly presented below. Furthermore, in the same handbook, Epstein (2009) provides practical

tools which can be used for promoting and creating better relationships between schools and parents.

Epstein's framework

- 1) Parenting** - supporting the parents in creating an effective learning environment at home
- 2) Communicating** - effective communication between educators and parents on school events and how the children are progressing
- 3) Volunteering** - capitalizing the skills and talents of parents, getting them to help
- 4) Learning at Home** - equipping families with information and ideas on how to help with homework and carry out curriculum-based activities
- 5) Decision Making** - parents are included in the decision-making process
- 6) Collaborating with the Community** - the resources and services within the community are identified and efforts are made to integrate them into family practices, school programs and for better learning for the students. (Epstein, 2009, p. 16)

Considering the future school, a key factor seems to be collaboration with the parents. Välijärvi (2011) claims that a school and its actions are always approved by the students, parents and the surrounding environment. For that reason, a school needs to be forthcoming and interact with everyone involved to thrive. The role of the parents will be emphasized, as they are more highly educated, are critical thinkers, and have higher demands for schooling. Parents will have more say in where their children are schooled, and they should be considered essential co-educators along teachers. (Välijärvi, 2011) Piispanen (2008) also pointed out that parents hoped the school would provide spaces for children to hang out, do homework and socialize after school, thus highlighting the significance of a school as an enabling community for many individuals and actions. Likewise, Epstein (2009) holds the view that community schools as a concept is resurfacing. It means a place where parents, students and other actors in the community are offered services and programs throughout the day, in and out of school hours. (Epstein, 2009)

Välijärvi (2011) presents that one of the reasons why we still have an institutionalized school system, is that it takes care of special tasks, which no one else deals with. Many of these tasks

are connected to the very fiber of our society and aim to address core values of our society, such as equality and functioning systematically. Some other tasks of a school are to guide the development of society as well as provide each citizen with a set of skills for a good life and to equip them to keep on learning throughout life. Traditionally, reading is an essential skill needed to survive in the society, and as Välijärvi (2011) claims, these days using digital tools for working and studying is just as important. That is why the school should teach with and about digital tools and ensure that children and young people gain a sufficient understanding of them. In addition, the significance of online and distance learning will increase. (Välijärvi, 2011.)

Furthermore, Piispanen's (2008) research considering "what is good" from the perspectives of teachers, students and parents, underlines that in the future, the school will be more than merely a place for learning and growing. It will be to some extent, a way of thinking or mindset. Välijärvi (2011) also underlines that the school environment is first and foremost, a social community, and a physical place for learning and working together. Furthermore Pohjola (2011) claims that: *"The school should be seen as a work community, which adapts, changes and develops according to society's needs and circumstances."* Based on these studies, it is evident that parents need to be involved in the school and the community surrounding the school as active players and equals, whose opinions are taken into consideration.

Pohjola (2011) points out that development in Finnish schools is no longer characterized by the building of schools or by adding new school subjects to the curriculum, but instead by the shutting down of schools or merging schools or rearranging how schooling is organized. Therefore, school development, by nature, is more complex than it was before. This view is supported by Välijärvi (2011) who writes that the core values of our society are no longer unanimous, which makes it more challenging to agree upon what values are good and central for the young generation.

3.2 Previous research

Previous research concerning the topic of this study, has primarily concentrated on teachers, students and policymakers. On the other hand, it is natural to view teachers and pedagogies as a way to implement digital technologies in the classroom. Though in recent years, some authors have begun to examine the parents' perspectives on ICT (Delen, Kaya, Ritter & Sahin, 2015; Ekici, 2016; Lindstrand & Brodin, 2004; Roncevic et al., 2016). Furthermore, in August 2018,

Microsoft Education partnered with YouGov and did an online survey on “*What parents think about technology in the classroom*”, which is slightly related to this study. The survey gives an indication of some of the topics that parents in the U.S. are dealing with, though it is not a full-scale study. One of the main findings was that over half of parents (63%) expressed a concern that children use too much technology at home, but on the other hand, they are more favorable when technology is used in schools and 86% believed that it can be beneficial for their children’s education. Therefore, where technology is being used was a key factor. (Sparvell, 2018)

Another finding was that parents believed federal and state governments can positively influence how schools receive support for ensuring that digital skills are taught at school. Furthermore, parents thought that teaching digital skills, Computer Sciences and other essential technological skills (such as coding) should involve big technology companies. As Sparwall (2018) pointed out, some companies and organizations have already taken action in bringing science professionals and teachers together to collaborate.

Parents and students

Roncevic, Kolić-Vehovec, Maglica, Smojver-Ažić and Pahljina-Reinić, (2016) also point out that the focus of research considering technology in education tends to be on teachers, and therefore their research focuses on how parents experience when their children use iPads in the classroom. Furthermore, there are very few studies that consider the long-term effects of using technology in an educational setting. Roncevic et al. (2016) argue that often the implementation of digital technology practices and tools into teaching aims to “*engage students in active learning*”. Yet, there are many more factors contributing to technology-enhanced learning experiences besides devices themselves. Also, pedagogical matters and attitudes of the whole surrounding community (parents, teachers, students) have an impact on the effectiveness. Roncevic et. al (2016) state that “*results suggest that experience with a particular ICT system provides better insight into its strengths and weaknesses and serve as a basis for usefulness perceptions and intentions toward ongoing use, while reducing the impact of social cues.*” This outcome implies that using technology for educational purposes can increase the understanding of both students and parents of what one can do with that technology, and most likely help to understand the limitations, while not creating too many high hopes.

Lindstrand and Brodin's study (2004) examines students with disabilities and their parents, and the experiences and needs that they have with ICT. Commenting on technology, Lindstrand & Brodin (2004) underline: "*In a social context **technology** can be activities that are performed together, where everybody can participate with the help of technology and with their individual prerequisites.*" (Lindstrand & Brodin, 2004). Thus, the collective and social aspects of technology are emphasized, with the objectives of participation, doing activities and taking into consideration the needs of individuals. The outcomes of the study were mainly positive, using ICT for communication and self-expression indicated to changes in social interaction and in addition the students could make their skills visible in ways that they may not have been able to before.

As Holloway and Valentine (2001) point out "*Current public and policy understandings of children's use of new information and communication technologies (ICT) contain paradoxical ideas about childhood and technology.*" The paradox is that children are both regarded capable of using technology fluently, but that simultaneously children should be protected from the dangers that technology can entail on an emotional level (Holloway & Valentine, 2001). This concern of the parents is also visible in the study of Delen et al. (2015), which investigated parents' perspectives considering the use of communication technology in general. Their findings reveal that firstly, parents are worried about the safety of their children online. Secondly, parents are aware that there are both benefits and risks with communication technologies. And lastly, parents remain somewhat doubtful if and to what extent communication technology can provide to be useful for their children. Delen et al. (2015) suggest more research about parents' perspectives on the topic in order to establish an understanding on how children can be guided and monitored safely while online.

In relation to this issue, Masters (2015) recommends that teachers and parents should collaborate more towards a common goal: that children learn the needed skills to maneuver safely online. This would require discussion "*about expectations, appropriate activities and techniques for supporting internet use.*" Another common aim could be that the online environment would become an extension of the physical world, where children grow up to be "*competent and confident cyber citizens*". Masters (2015) compares learning to function in an online environment to learning to drive a car. Driving a car can be dangerous, but the benefits it provides are worth the risk. Before an adolescent can drive a car, they have to practice under supervision (Masters, 2015).

In a study undertaken by Hakkarainen, Ilomäki, Lipponen et al. (2000), students' skills and practices in using ICT in Finnish schools were investigated. Though the study could be considered outdated, many of their results still seem valid and descriptive. Their findings reveal that an educational change fueled by ICT can only happen when 1) the new technology is accessible to teachers and students 2) it is used in many different situations and subjects and 3) the teachers and students have adequate skills which enable them to work with and use the new technology productively. One surprising outcome they encountered, was that even though their study specifically targeted schools which were known for their rich use of ICT, these schools still did not use ICT as a day-to-day practice in their schools, despite Finland being known for its advanced information technology. (Hakkarainen et al., 2000) This result may have been due to the fact that many of the everyday ICT practices and digital tools have assumingly changed in the last 20 years, and hopefully the situation has improved.

Teachers

Albugami and Ahmed (2015) examine the implementation process of ICT in Saudi Arabian schools. Taking the viewpoint of teachers, students and school-leaders *"The results show that ICT was perceived as an important tool in improving performance, collaboration, learning experience and learning outcomes. However, various challenges affect the application of ICT in Saudi secondary schools."* Some of these challenges were the lack of resources and lack of ICT skills among school staff. Especially the lack of trained personnel had an impact on the integration of ICT into lessons.

In another study, Cunska & Savicka (2012) are more positive that using ICT in teaching mathematics can add value to learning and is achievable. Their study claims that ICT and interactive methods are integral for motivating students, who represent a different generation. Cunska & Savicka (2012) highlight four main factors for integrating ICT into teaching 1) the role of the teacher and methods chosen matters, 2) collaboration among the students and with the teacher is essential, 3) using contemporary multimedia methods with traditional ones can prove to be beneficial and 4) using more interactive practices can expand learning outside the classroom.

All in all, these studies imply that there is a wide-spread need for more research, training and increasing awareness considering ICT theories and practices, among educators both in school and at home.

4 Methods

In this chapter, firstly, the methods used in the study will be clarified and justified. Secondly, the chosen sampling strategy, the research context, participants and data collection process will be presented. Then the thematic analysis will be laid out, including the challenges of the process. To conclude, section 4.4 discusses my position as a researcher and the ethical issues which were encountered and it evaluates the reliability of this study.

The study takes a qualitative research approach, which examines experiences, perspectives and concepts of people in detail (Hennink, Hutter & Bailey, 2011). Qualitative research aims to understand and explain a certain event, phenomena or topic (Eskola & Suoranta, 2005). In addition, qualitative research attempts to answer the questions “*what, why and how*” (Snape & Spencer 2003), therefore it is explanatory by nature. Considering education technology, Willis claims “*A great many questions in educational technology are either **how** or **why** questions*” (Willis, 2008), which is in line with what qualitative research intends to find out. Qualitative research is generally favored over quantitative in the educational field, thus it seemed a natural starting place for this study.

According to Bogdan & Biklen, (2007) there can be multiple goals in qualitative research - ranging from forming a grounded theory to producing a description of a phenomena. One common factor, despite different goals, is aiming to form an understanding of human experience and behavior. Human behavior is complex, and therefore cannot be explained explicitly. (Bogdan & Biklen, 2007.) Another consideration is how the researcher positions themselves in relation to the research subjects and research topic. Referring to Bogdan and Biklen (2007) “*Qualitative researchers try to interact with their subjects in a natural, unobtrusive and nonthreatening manner*” (p. 39). Due to how my data was collected - as an anonymous electronic questionnaire - I did not interact with the research subjects directly. Of course, this was a choice I made, to distance myself from the research subjects. Despite that, some of the research subjects recognized me, and wished me luck in my research.

4.1 Context and Participants

The participants for the research were parents living in the Oulu region. The responses were collected by using an electronic questionnaire with open-ended questions by using **Google**

Forms⁴. Later in this chapter there will be further elaboration as to why this data collection method was selected and how it was implemented. Some of the reasons why adults were selected as participants, was firstly, there is plenty of existing research about teachers and students considering ICT, but less studies explicitly focusing on parents. Secondly, it was considered more practical to receive the informed consent of parents for the research than attempting to research children from any given school.

Criteria for selecting the subjects were as follows:

1) You have one child or more children in grades 1-6. 2) You do not work in the field of education. 3) You live in the Oulu region

The reasons behind these criteria, were to find out how average primary school parents, without any apparent connections to education, would define ICT and what school practices they would mention. As mentioned before, the curriculum serves primarily to aid teachers, and therefore, it could be assumed that very few parents would be aware of what kind of methods or learning the curriculum implies. It seemed fitting to research parents in the Oulu area, because it is known for its technological innovation and richness of ICT (Rantakokko, 2012). Moreover, grades 1-6 were selected because previous research tended to focus either on early childhood education i.e. preschool children or high school students (7th to 9th graders).

The sampling used in this study is mainly purposive sampling, which is a type of non-probability sampling (Cohen, Manion & Morrison, 2017), and thus points to small-scale research. Moreover, the main focus is on targeting a certain group, *“in the full knowledge that it does not represent the wider population; it simply represents itself”*. (Cohen et al., 2007 p.113). Purposive sampling lets the researcher set certain criteria and even handpick a group of research subjects who share some attribute or commonality the study is about. In this study that group is parents with children in grades 1-6, attending the schools I contacted in the Oulu region. The advantages of non-probability sampling are that it is less complicated to set up, less costly and sufficient when there is no objective to generalize the findings. Qualitative research rarely aims to generalize findings, as often the focus is on a particular item of interest. (Cohen et al., 2007.)

⁴ Google Forms is an app from the Google Drive office suite, created specifically for making surveys or quizzes. https://en.wikipedia.org/wiki/Google_Forms

During the test phase and before opening the questionnaire, I debated on how to distribute the link to the questionnaire. Primarily I had thought of only approaching parental organizations in the Oulu region, but it became evident that such an approach might not give enough responses for the research. Furthermore, it seemed more natural to approach schools with such an attractive topic, even though that the parents were in the focus instead of students or teachers. The schools of Oulu are divided into four main school areas, according to their geographical location: North, South, East and Central. In addition, there are other schools, which may be privately funded or specialize in a certain area or pedagogy. Two schools were selected randomly from each school area, but in the end, most responses came from the central school area.

Before the data collection process was initiated, a pretesting phase was carried out for the questionnaire. This was done with the intention to increase the reliability and functionality of the questionnaire. Not only could I see how the electronic questionnaire functioned, but the test participants were asked for feedback. The participants were friends and family and the sampling criteria was not applied otherwise than that they had children in grades 1 to 6. Two main findings arose from the test surveying: 1) a need for further clarification to Q4 *What kinds of ICT skills do you find important?* and 2) the answers provided were short. The respondents did not elaborate very much on what reasoning led to their answer. Addressing the first issue led to the forming of a follow-up question Q5 *Why do you think these skills are important?* Considering the second issue, this is common with electronic questionnaires. In general, qualitative research focuses on analyzing the text, speech or content, and therefore even a small amount of data can be used effectively for research (Lichtman, 2006). What is more important, is how that data is analyzed and if the data collection is saturated. The data collection is saturated when increasing the amount of responses does not add any further value to the research (Saunders et al., 2018). Therefore, based on the test answers and earlier deliberation, the target amount of twenty respondents was estimated to be an adequate amount for this research.

As I had less time to collect data from respondents due to having to apply for research permission for the schools, I decided to contact organizations in the Oulu region that focus on parenting and family related activities. Two of these organizations agreed to share my survey on their Facebook pages, and I received some responses through this. In the last week of my data collection period, I received the research permission for the schools and quickly received all of the responses I needed for my research, meaning I had 20 responses altogether.

4.2 Data Collection

The data collection method chosen was an electronic questionnaire with open-ended questions. It was convenient for both the researcher and the respondents and it has become a more common practice with the emergence of many digital technologies. The electronic questionnaire software used was **Google Forms**, as it was a familiar platform to the researcher, relatively easy to use and sharing the link was quite straightforward via email.

The advantages of using the method are the following. Firstly, it is an efficient way to collect textual data - as the collected data was already in text form, there was no need to transcribe audio or video recordings. Secondly, it was thought to be an accessible way for the parents to participate in the research: making an electronic questionnaire available online requires less effort for the subjects to participate considering time and geographical positioning. Participants could take part in the research from wherever they are. (Cohen et al., 2007) Some of the disadvantages were receiving relatively short answers, as there was no possibility to gather more information if needed. Thus, I was unable to gather deeper knowledge and I had to use semantic interpretation of the data. There was also a risk was that someone not fitting to the criteria would fill in the questionnaire - but that once again was a factor which could not be influenced by me. It was also highly unlikely as I decided not to offer any incentive for filling out the questionnaire.

Questions for the questionnaire were divided into three categories: Basic information; ICT in general and ICT in the classroom in the future. The first category aims to find context. The second category delves into the parents' own perceptions on ICT and the last category illustrates both the practical experiences parents have and how they see ICT as part of the future. The outlined questions for the questionnaire can be found in Table 1. The language used in the data collection process was Finnish.

Table 1. A simplified table representing the questions used for the questionnaire.

<p>BASIC INFORMATION</p> <p>1) In what grade is your child or your children? 1st – 2nd – 3rd – 4th – 5th – 6th (multiple choice)</p> <p>2) In what region does your child/ do your children go to school?</p>
<p>ICT IN GENERAL</p> <p>3) What is information and communication technology (ICT) to your understanding?</p> <p>4) What kinds of ICT skills do you find important?</p> <p>5) <i>Why do you think these skills are important?</i></p>
<p>ICT IN THE CLASSROOM AND IN THE FUTURE</p> <p>6) Give an example of how ICT has been used in the school of your child or children.</p> <p>7) How do you see the importance of ICT skills in the future?</p> <p>8) Field for further elaboration (<i>Instruction:</i> Here you can write other things that come to mind or provide feedback)</p>

The majority of the questions are not explicitly about the school or classroom practices but rather on the understanding of the parents. Only one question out of seven questions “(6) *Give an example of how ICT has been used in the school of your child or children*” directly addresses that topic. Though, after re-reading the responses, it was clearly visible that the parents had answered the questions with school practices in mind. This was most likely due to the introduction of the research, which explained the purpose of the research and the criteria (**Appendix 1**). In the introduction I introduced myself and my field of study. Moreover, I stated that I am doing a study focused on parents’ perspectives on Information and Communication Technology (ICT) in school. After that, the criteria for answering the questionnaire was presented. The last paragraph of the introduction was in order for the

parents to be aware that by filling in this questionnaire, they gave their consent to use their responses in the research and furthermore it clarified that the data collected would be used solely for research purposes. This was done in order to increase reliability. Lastly, there was an estimate on how long it would take to fill in the questionnaire, which was 10-20 minutes. Therefore, the parents could decide more easily when they would have time to fill in the questionnaire. This was more or less the same introduction used when I approached school principals via email.

I could have added the option for the participant to take part in an interview in addition to filling in the questionnaire, but I chose not to. As was, the received data came in anonymously, and there was no way to follow-up in case I was interested in gaining more information. This was one of the limitations of using an electronic questionnaire for collecting the data.

4.3 Thematic analysis

Thematic analysis was chosen because it seemed a suitable fit for the planned research. The main task of thematic analysis is to search for items of interest and patterns of meaning across the data set, which in this case are the different themes connected to parents' perspectives and how they understand ICT. During the analysis process the analyst should keep writing at the front and move between the varying data sets (Braun & Clarke, 2006).

Braun and Clarke (2006) break down the thematic analysis process into six phases and elaborate further on each step. These are: 1) familiarizing yourself with the data, 2) generating initial codes, 3) generating themes, 4) reviewing themes, 5) defining and naming themes and 6) producing the report (Braun & Clarke 2006, pp. 16-23). Yet, Braun & Clarke emphasize that using thematic analysis is not a linear process, but one that makes the researcher move forward and backward within the data set. Spencer, Ritchie and O'Connor (2003) discuss a process similar to Braun and Clarke's six phases, which they refer to simply as data management. Some of the main steps Spencer et al. (2003) name are: *"identifying initial themes or concepts, labelling or tagging the data, sorting the data by theme or concept and sorting and synthesizing"* (Spencer et al. 2003, pp. 221-231).

This leads to a notion where thematic analysis is seen as part of a process, instead of being recognized as a full-fledged method. Despite that, both presented cases agree that there is a

need for clear documentation of the process, whether doing the analysis or the initial managing of data (Braun & Clarke 2006, p. 26; Spencer et al. 2003, p.237.). Therefore, the analysis process has been written out accordingly. In any case, Braun and Clarke (2006) advocate that thematic analysis can be used as an independent research method, and their viewpoint has gained much support during the last years (Maguire & Delahunt, 2017; Castleberry & Nolen, 2018).

Starting out

The first two questions from the basic information category were eventually considered unnecessary for the research. These questions addressed which grade their child or children were in (Q1) and which school area or school the children attended (Q2). These served more to help me understand the background of the research subjects. One possibility could have indeed been, that the parents would have been classified according to which group their child/children belonged to (A= 1-2 grades or B= 3-6), because there are different objectives in the curriculum regarding those two groups. Yet, as the data collection was still manageable without the division and there were not significant differences between the two groups, this was not a necessary step.

Step 1 Familiarizing myself with the data

The first step was exciting. To finally see the responses and the effort put in them by the parents. What *do* parents think? The data, which was in Finnish, was read through a number of times. I first attempted to start the analysis in English directly from the data collection, even though the answers were in Finnish. During that course of action, it became evident that the data collection had to first be translated into English. Otherwise, there may have been the possibility that the initial codes would be simple translations from Finnish to English, instead of being descriptive codes, conveying more meaning. Only after that could there be a transition to the next step. Translating was also a good way to familiarize myself further with the data and find out what the main concepts were in English. This required some consideration, as all of the concepts were not directly translatable. As mentioned earlier in the study, computational thinking and ICT are not necessarily known concepts or commonly acknowledged in Finnish.

Another starting point was to not view the summary of the responses that Google Forms had automatically created, until later in the process. I did not wish to form the themes based on the questionnaire questions or preconceptions of my own, but instead I wanted to have room for creative and original observations which came from the data when the research subjects were viewed individually.

Step 2 Generating initial codes

I decided to use the **NVivo 12**⁵ software program for the coding process. One of the reasons for this, was the nature of the research. Because the research is focused on the aspects of ICT, it seemed fitting that I challenged myself in learning a new software, which has been specifically developed for qualitative research purposes. Yet, it was imperative to keep in mind, that the analysis should be made with care and effort even though there is significant use of computer software involved (Braun & Clarke 2006, p. 24; Ritchie, Spencer & O'Connor 2006).

Nonetheless, it was easy to proceed in creating the codes, because all the codes were always readily available and visible in a single list, and furthermore, they could be arranged alphabetically or based on how many referenced files they entitled or other categories. When needed, I could either create a new code, or search for a similar one. The top ten most frequent initial codes after the first round were the following: *Purposefulness*, *Future employment*, *ICT part of everyday life*, *ICT in teaching (little)*, *Personal safety*, *Communication at front*, *Using games in teaching*, *ICT skills important*, *Devices & ICT Skills*. Out of these, the last two codes had various subcategories, because their scope was so broad. This was done in order to help in the next step, when generating themes.

After the initial coding process, I already noticed how some of the pieces from the dataset were coming together and shared meaning. Furthermore, it was visible that some of the research subjects had an individual emphasis on a certain topic within ICT, for example participating, social media or online safety. Often their whole response revolved around that theme, resulting in some overlap in the answers. A semantic approach was used largely in the coding process. Therefore, the text was interpreted with a “face value” or by surface meaning, without too much deeper investigation (Braun & Clarke, 2006). In some passages

⁵ NVivo12 is software used for organizing, processing and analyzing qualitative and mixed-methods data <https://www.qsrinternational.com/nvivo/what-is-nvivo>

using a semantic approach was not strictly applicable, as the responses either directly answered the question (e.g. “they are important”) or they might have referred to another answer within that same data item. In that case the data items were viewed in a holistic manner, taking into consideration the whole narrative.

Step 3 Generating themes

The next phase proceeded to generating overarching themes, which would help make sense of the data. All the initial codes were in NVivo 12 as a list; therefore, it was effortless to go through that code list alphabetically and see which different codes bore similarities and could be encapsulated under the same theme. Furthermore, as the study was data-driven, it was reasonable to try and see what could be found in the data and then form themes based on that. After the candidate themes were generated, it seemed logical to turn to reviewing literature considering these themes and their definitions. According to Braun & Clarke (2006), it is not unusual to move back and forth between the data set and theories while doing a thematic analysis.

Step 4 Reviewing themes, level one

One of the principles of thematic practice, which is underlined by Braun and Clarke (2006), is not to rush through the analysis process. Therefore, I did not go back to the reviewing the candidate themes until I had delved into the literature, hoping it would help gain perspective. I also realized that this step was a two-part process and I should have given more thought to sub-groups already in the previous process. Nonetheless, my next action was to carefully read through all the initial data extracts and see if they were coherent and significant to the analysis. When needed, the codes and themes were improved, merged, rephrased or even removed to improve clarity and convey the meaning better. At this point the certain sub-groups became more evident and the relationships between different groups were identified.

This phase required decision-making, on which data extracts or codes were more noteworthy than others. Another factor which had an impact on those decisions, was if there was enough data to support the extracts. After thorough scrutiny, the themes amounted to a total of eight. Yet, this was not quite sufficient. At this point I was unsure about where this data-driven process was leading me, because the literature I reviewed was telling a story of its own. Some of the themes still seemed unmanageable, and their relationships were unclear. The more I

read, the more perplexed I grew. At that point a new theme emerged; 21st century skills. But was there enough data to support it as a self-sufficient theme? I had not thought about it earlier, but it did seem a reasonable theme, both viewing the literature and the data set. There were many skills that the parents had considered important, which did not strictly go under the theme of ICT - such as creativity, social skills and critical thinking. I once again distanced myself from the data for some days to gain perspective. Once I came back to themes, I made a rough thematic map of what I had processed so far (Table 2). Reviewing the research questions helped in finding what was essential. In this phase I used multiple tools parallelly (such as Word, Excel and drawing manually) to help me understand the relationships between different themes and the depth of each theme. The outcome can be viewed below in Table 2, which displays three main themes with their subthemes listed under them. Though this is a qualitative research, I did take into consideration if the themes formed were strong enough based partially on how frequently they appeared in the data. If a certain item of interest was mentioned only once or twice, or if the meaning of the answer was unclear, that usually did not lead to forming a theme.

Table 2. A table of the first thematic map.

What is ICT?	Parents	Changes caused by Technology
ICT skills and tools (devices)	Fears	In society, daily life and education
Communication	Perspectives	Reasons for learning
Competences	Express inexperience	Important to learn
21st century skills		

Step 4 Reviewing themes, level two

Moving forward with the analysis to level two, I went back to the start and read through my entire data set again. I first only read the original Finnish data set, and then I read the English and Finnish data sets parallelly, in order to check if the translation I had done earlier seemed

descriptive and sensible. A few small adjustments were made. After this I worked with NVivo 12, trying to manage the themes. As the 21st century skills had been introduced as a new theme, I reviewed the data from that perspective as well. That specific theme appeared justifiable, as earlier I had previously listed the topics of e.g. creativity and employment under a code of “Valuable skills”, but now I had something more substantial to build on. Ultimately, I was able to come to a conclusion as to what was essential in the data set. Thus, I formed my final thematic map (Figure 1), which is presented in the beginning of Results.

Step 5 and 6 Defining & naming themes and Producing the report

Both of these phases are realized in the next chapter, and step 6, to some extent throughout the study. Step 5 introduces the defined themes and the data extracts which support and form these themes. Much thought and deliberation has been put into the themes, in order for them to be cohesive, clear and meaningful. Throughout the thematic analysis, the actions and progress of the process have been outlined and justified.

4.4 Research values, reliability and ethical considerations

While on this journey, it is imperative I describe my stance as a researcher. My ontological perspective -what is to know about the world - is idealism, which according to Snape & Spencer (2003) “*asserts that reality is only knowable through the human mind and socially constructed meanings*”. On the epistemological side - how it is possible to know about the world - my study is based on inductive logic, which builds knowledge from the bottom up and eventually can evolve into a theory or theories. (Ormston et al. 2014; Snape & Spencer, 2003.) Therefore, these underlying principles have guided the course of the thematic analysis and have had an impact on the interpretations made based on the data. Lastly, by using a questionnaire I have to believe that self-reporting can be a basis for constructing information (Cohen et al., 2007).

Considering research ethics, anytime research is done, much deliberation must be given to the course of the research and issues that will arise (Cohen et al., 2007). Participants must be protected throughout the research from certain aspects. Some of the risks are: 1) revealing information that causes an individual harm on a social or personal level, 2) disruption of family or community ties or 3) affecting the position in occupational settings (Nalita & Busher 2011). To highlight the importance of ethical issues, Nalita and Busher (2011) state

that there are several places in the research process where ethical dilemmas can appear, therefore there must be deliberation in every step. These dilemmas range from “the context of the research” to “the type of data collected” to “the nature of participants” (Nalita & Busher 2011). Also, Cohen et al. (2007) list similar issues to take into account (the nature of the research to data collection methods) when designing research and present ethical issues which may occur throughout the research. In this study, ethical issues considering the individual were few, as the questionnaire was implemented anonymously. Moreover, in order to protect the data and keep it organized, a separate email account including cloud services was created solely for research purposes. Furthermore, the obtaining and receiving of a research permit indicated that conducting the study was approved by the city of Oulu, which increased the reliability of the research.

One thing I learned by doing the thematic analysis, was that I could have been more descriptive and elaborate in each phase. Because I used the NVivo 12 software to help with the analysis, the same project file was updated and rewritten upon. By the time I made it to step 4 in the analysis, a significant part of my initial codes had been deleted or merged, and I did not have anything to indicate where I had started out from, in case I would have wished to go back and see. Another aspect - which crossed my mind - was that the whole analysis is an interpretation from my point of view. Had I had a research partner, that could have brought more reliability to the coding process and helped in forming the themes. But even though I did not have a peer-analyst available, throughout the process, my work was reviewed by and commented on by multiple outsiders such as friends, my thesis supervisor as well as a peer-reviewer i.e. opponent. Their feedback helped gain perspective on what I was doing. Nevertheless, I attempted to retain an objective and neutral approach to the data collection throughout the analysis. Thus, I have described the process in much detail, in order to increase the reliability and transparency. The lesson learned was incorporated into step 4 of the analysis, as I added Table 2 to demonstrate how the process was proceeding.

5 Results

The aim of this chapter is to present the results of the thematic analysis, which is done primarily by outlining the themes that were formed based on the data set and data extractions. Firstly, there will be a general description of the common features and the differences in the data set. Secondly, Figure 1 provides an overview of the relationships between the themes. It was created using NVivo 12's mind mapping tool. Thirdly, first Table 3 and then later Table 4 show the breakdown of all themes, which will be discussed in detail. The data extracts always indicate which question is being answered, with a capital Q+number (3 to 8) preceding each extract. This was found helpful in the analysis phase in creating context and understanding which question the subject was answering. In addition, extracts from a similar topic or question have often been gathered together to promote clarity.

5.1 Commonalities and differences

Commonalities in the data set

There were many commonalities in the definition of ICT. This was linked to the first research question, which will be discussed in more detail in the next chapter. Parents defined ICT mainly as skills, tools, practices, competences and communication. In addition, they found it important to have an all-round proficiency to be able to work with different devices and grow to be a critical, independent thinker. The reasons for learning ICT very often revolved around the need for coping in school and life after school as well as safety issues. Being competent with technology was seen to have an impact on future employment. Also, larger changes in society have made it imperative to live one's day to day life with technology, and benefit from that technology, not to be "enslaved by it" or too dependent. A recurrent theme in the responses was a sense amongst research subjects that ICT is important or increasingly important. Only some respondents said that technology - although important - should not bypass traditional ways of learning and communicating. Some parents expressed a concern that technology can at times be valued too much, or the use of it can become addicting or oppressing. ICT was also defined by some 21st century skills, of which the most important were ***Life & career, ICT literacy*** and ***Communication***. In general, a diverse variety of items of interest emerged.

Differences in the data set

As mentioned earlier in the thematic analysis, if the research subject focused on a certain aspect of ICT in their definition part, they often brought up that same aspect later as well when considering which practices, or which skills were important. There were considerable differences in what kind of topics were emphasized. For one parent, learning ICT competence meant identifying online threats and learning how to avoid or protect oneself from them, for another parent, media literacy and mastering social media was a key element of ICT and for others the definitions varied from school subjects to emerging technological practices. In addition to concerns and definitions, parents voiced some aspirations that they had considering ICT and living in a technology-enhanced world. One parent hoped that their children would still appreciate face-to-face communication, while another wished that they would have learned about these in school themselves and a third parent hoped that there would be sufficient resources for teaching ICT in school.

5.2 Parents as the main theme

Choosing parents as an overarching topic seemed a natural starting point for all of the themes, because essentially the whole study is based on the definitions, experiences and perspectives of parents. Four general themes emerged from the analysis, which were Perspectives, Concerns, Changes caused by technology and Defining ICT. Comparing Figure 1 from below to Table 2 in the previous chapter, some of the same core elements can be identified - but instead of having three individual themes, two of the previous main themes (*Changes caused by technology* and *Defining ICT*) have been brought to the same level as *Perspectives* and *Concerns* and thus, act as general themes.

Figure 1. Final thematic map of main themes

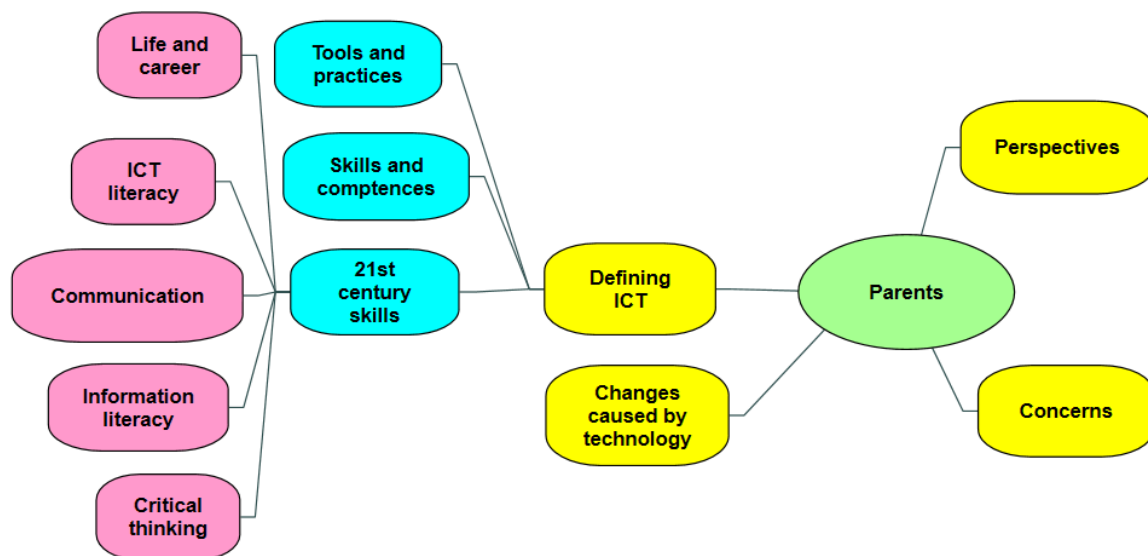


Table 3. Table of main theme and general themes

Main theme	Parents			
General themes	Perspectives	Concerns	Changes caused by technology	Defining ICT *
Subthemes and <i>further subthemes</i>	ICT skills important	Little ICT in teaching	ICT increasingly important	Tools and practices
	Hopes	Many threats online	ICT new and rapidly changing	Skills and competences
	Human above technology	Cautious approach to ICT	Pervasive technology requires adaptation	21st century skills
	Starting early vs. later start	Parents and teachers	Transforming learning and	

		inexperienced alike	working environments	
	Reasons for learning tech			<i>*cont. in Table 4</i>
	<i>Safe use of technology</i>			
	<i>ICT essential for all</i>			

5.2.1 Perspectives on how parents view ICT

As can be seen in Table 3 above, Perspectives can be broken down into five subcategories which are: 1) Reasons for learning technological skills, 2) Information and communication skills important, 3) Hopes, 4) Human above technology and 5) Starting early vs. later. Perspectives as a theme encompasses some of the main thoughts and core values or opinions that parents voiced out (i.e. Human above technology). Reasons for learning technological skills reveals some of the reasons or arguments that parents presented in favor of why and what children should learn in school. It partially explains the underlying factors to why parents considered ICT important or increasingly important. Though only two reasons are listed here (Safe use of technology, ICT essential for all), there are many more reasons provided throughout the results. More often than not, the justifications were connected to how ICT was defined, and therefore those themes have been discussed in relation to the definition.

Some parents voiced their concerns about technology being addicting or pervasive. This often went hand in hand with the safe use of technology theme, because the parents were worried about multiple issues. And although the theme *Human above technology* could have been listed under the Concerns theme, this was interpreted to be something that only a few parents expressed as what they thought, and therefore it was considered solely their opinion on the matter. This can be seen in the following extracts:

Q7. *Though, it should be remembered that entertaining use is easily addicting and therefore the use should be conscious and limited.* [Parent 16] Human above tech

Q4. *It [ICT] should be a servant, and we should not be enslaved/chained by it.* [Parent 1] Human above tech

In answering Question 5 *Why do you think these skills are important?* research subjects gave the following responses:

Q5. *“not revealing too much information about yourself or revealing pictures, so protecting oneself---”* [Parent 1] reasons for learning tech, safe use of tech

Q5. *“They are needed [skills] to get along independently in an information society.”* [Parent 8] reasons for learning tech, ICT essential for all

The answers to Question 7 (*How do you see the importance of ICT skills in the future?*) were often quite short, some of them ranging from one word to one sentence. On the other hand, some parents elaborated on this question and gave detailed narratives of the changes that could happen. The brief answers may perhaps be attributed to the question itself, which could have had a similar partner question like Question 4 and Question 5. In short, those two questions aimed to ask **what** kinds of skills are important and **why**. Later in the study this same limitation can be seen when Question 7 re-emerges considering the increasing importance of ICT.

Q7. *“Great [significance]. There is no way to survive without. Perhaps even the most important civic skill.”* [Parent 1] ICT skills important

Q7 *“Really significant.”* [Parent 18] ICT skills important

Q7. *“My 50-year-old husband does not really know how to use a computer and everything from paying bills to Wilma-messaging⁶ is taken care of by via a computer. These days children must learn these things at school, because there should not be cases like my husband.”* [Parent 4] reasons for learning tech, ICT essential for all

⁶ Wilma is a messaging platform commonly used in school for teachers to communicate with parents via digital messages

Considering hopes, interestingly, was something that the parents shared voluntarily in Question 8, which was a freeform field, in case the research subject wished to share something more. This could indicate that further themes and perspectives may have emerged also with other research subjects, had I used interviewing as a data collection method. But as following extracts were not directly related to either of the research questions, this theme served as a place to voice out what parents' hopes were in relation to ICT.

Q8. *I wish I would have learned about these things in school myself.* [Parent 20]
Hopes

Q8. *"I hope there are enough dedicated resources for teaching ICT, acquiring devices, lessons and financially."* [Parent 14] Hopes

Q8. *"Amidst all this information overload, I yet wish, that the next generation would feel the urge to communicate face-to-face"* [Parent 7] Hopes

These results suggest that more research needs to be done to find out the expectations and views of parents considering implementing technology in schools and teaching, and also that parents should be involved in the training process.

Two conflicting discourses emerged considering when and how ICT should be incorporated into teaching. As one subject put it:

Q8. *"There should be a dedicated media/ICT teacher and ICT subject starting already from first grade."* [Parent 1] Starting early vs. later

Yet, another subject said:

Q7. *"They [ICT skills] are of great significance, but of course there is time to learn later, so there is no need to learn them starting from first grade."* [Parent 14] Starting early vs. later

These contradictory approaches visualize how divided parents' opinions can be and why at times formulating themes was complex.

5.2.2 Concerns parents had considering ICT

The theme of Concerns acts as a counterpart for Perspectives. It is divided into four subcategories, which are the following: 1) Little ICT in teaching, 2) Many threats online, 3) Cautious approach to ICT and 4) Parents and teachers inexperienced alike. Concerns highlights topics that parents were concerned or felt strongly about. It was clear that some parents view ICT as an unfamiliar concept, and some had not experienced or heard about any ICT in school practices. This can be seen from the following extracts, while defining ICT (Q3), answering Question 6 “*Give an example of how ICT has been used in the school of your child or children.*” as well as narrating in the freeform field (Q8).

Q3 “*It [ICT] is quite unfamiliar to me. But I assume it means computers, smart devices with their features and social media among other things*” [Parent 3]
Parents and teachers inexperienced alike

Q6 “*They do use computers to some extent, but to my understanding, there is very little use of ICT.*” [Parent 9] Little ICT in teaching, using computers

Q6 “*There really isn’t any. Even the teachers cannot distinguish advertisements from notifications. My child had received an advertising leaflet about nuclear power from school as information on the topic.* [Parent 18] Little ICT in teaching, Parents and teachers inexperienced alike

Q8. “*There could have been a page including the definition of ICT, so that by the end [of the questionnaire] the answers would have been more on topic.*” [Parent 4] Parents and teacher inexperienced alike

Q8. “*Well, it is very difficult to keep a consistent awareness of these matters, because the teacher has to know “everything about everything”. --We have IT and media skilled people at home, but it still feels as if we do not know enough about the matter from the current perspective, because information is outdated quickly while the world changes at lightning speed.*” [Parent 1] Parents and teachers inexperienced alike

These results highlight that parents feel they should know more than they currently do, and they also indicated some feelings of vulnerability and inexperience. The lack of ICT practices could be considered alarming, as we are currently living in a technology-enhanced society. On the

other hand, there were plenty of other examples of ICT practices, which will be presented under Defining ICT. Furthermore, there are many perceived threats online, such as compromising personal safety and the risk of being misled. Some parents also express a cautious approach towards technology, which can be gathered from the following extracts.

Q4. *“and one also masters social media and can identify its dangers.”* [Parent 6]
many threats online

Q5. *“If you are not competent in source criticism or you do not know how to protect your social media [account] you are completely gullible. Problems with information security can cause a catastrophe with e.g. your credit card or etc. bigger issues.”* [Parent 1] many threats online

Q7. *“It [ICT] is an important part of teaching, though I still hope that there would not be too much writing or searching for information solely using the computer. Writing by hand and finding information in books is more important.”* [Parent 11]
Cautious approach to ICT

Q8. *“We have an agreement with my child, that they are going to use a feature phone for years and we are not going to buy a smartphone. Mom could also transfer back to using a feature phone.”* [Parent 16] Cautious approach to ICT

5.2.3 Changes caused by technology

Changes caused by technology impact our society, everyday life and transform our surrounding environments. Technology is seen to be rapidly changing and pervasive - on the brink of being intrusive. For this reason, parents expect the significance of ICT to increase and believe that further development is inevitable, which means that their children will have to learn to live in a technology-induced society. There were four subcategories under this general theme: 1) ICT increasingly important, 2) ICT new and rapidly changing, 3) Pervasive technology requires adaptation and 4) Transforming learning and working environments.

Most of the parents responded to Question 7 (considering the importance of ICT in the future) that it was either important, or increasingly important. Throughout the responses, it was often simply stated, without any reasons to why. As earlier mentioned, this was one limitation of the

question. This leads to the conclusion that ICT is already taken for granted and plays a significant role in our lives and societies, and very few have any doubts that it would continue to be so in the future. Only a few parents were cautious to what extent ICT would or should impact our lives, which was already discussed in the previous theme (Concerns).

Q7. *“They are increasingly significant.”* [Parent 8] ICT increasingly important

Q7. *“The significance [of these skills] will yet increase”* [Parent 2] ICT increasingly important

A number of issues were identified regarding changes that have happened, that are happening currently or adjustments that should be made in order to facilitate ICT in our everyday lives. The extracts below point these factors out. Especially Question 5 *“Why do you think these skills are important?”* gives reasons to why and what changes are happening and why it is important to learn ICT skills.

Q5 *“It is the future; development has gone forward rapidly starting already from the 80’s and it continues to do so”* [Parent 6] ICT new and rapidly changing

Q5 *“Because the society is getting more and more technological. In addition, when the majority of communication is digital, also the social aspect is more significant.”* [Parent 7] Pervasive technology requires adaptation

Q7. *“ICT skills are important and essential in work life and daily life, for there are many practical tasks which are taken care of in varying virtual environments. This may be emphasized in the future.”* [Parent 13] Transforming learning and working environments

Q8 *“information is outdated quickly while the world changes at lightning speed.”* [Parent 1] ICT new and rapidly changing

5.3 Defining ICT

Defining ICT boils down to three main themes: *Tools and practices*, *Skills and competences* and *21st century skills*. Even though ICT literacy by itself is a part of 21st century skills, further defining ICT on a whole was needed, as ICT was interpreted to be more than simple literacy. Tools and practices can represent more tangible or concrete elements of ICT, while skills and competences are more intangible by nature, and often refer to abilities, which can be

learned. 21st century skills have been divided into further subthemes, and they form their own chapter.

Table 4. Defining ICT and subthemes

General theme	Defining ICT (cont.)		
Subthemes	Tools and practices	Skills and competences	21st century skills
<i>Further subthemes</i>	<i>Emerging technological practices</i> <i>(N.B. includes using games in lessons)</i>	<i>Media education and social media,</i>	<i>Life & career</i> <div data-bbox="1050 611 1385 779"><i>Investment in future and employment,</i></div> <div data-bbox="1050 779 1385 947"><i>ICT part of everyday life</i></div> <div data-bbox="1050 947 1385 1048"><i>Need of skills in school</i></div>
	<i>Devices</i>		<i>ICT literacy</i> <div data-bbox="1050 1171 1385 1574"> <i>Digital literacy:</i> 1) writing with word processor 2) touch typing 3) technical use </div> <div data-bbox="1050 1574 1385 1798"> <i>Digital fluency:</i> 1) Managing data 2) Internet as a tool </div>
	<i>Working on the computer</i>	<i>Diverse use of technology</i>	<i>Communication</i>

	<i>School subjects</i>		<i>Information Literacy</i>
			<i>Critical thinking</i>

5.3.1 Tools and practices

Tools and practices cover the subthemes of emerging technological practices (incl. using games in lessons), devices, working on the computer and school subjects. Some parents briefly mentioned some specific school subjects, such as Mathematics, languages (Finnish, English) and Computer Sciences, but they often referred to the use of games in the same context and one parent defined ICT simply by listing two school subjects.

The next data extracts contribute to the definition of ICT and answer Question 3 “*What is information and communication technology (ICT) to your understanding?*”

Q3 “*The Internet, **programming**, social media, mobile phones, computers, **robotics**, tablets, base stations, even cables*” [Parent 1] Emerging technological practices

Q3. “*All the devices and programs that enable one to communicate or participate*” [Parent 20] Devices

Q3. “*ADP [computer sciences] and native language [Finnish]*” [Parent 4] School subjects

Considering practices, the themes mainly revolved around the use of existing resources.

Q6 “***3D-modelling**, video, using **Kahuut [Kahoot]** quizzes for learning, and utilizing students’ Microsoft accounts during the lessons.*” [Parent 10] Emerging technological practices, using games in lessons

Q6 “*Using an online program to increase the child’s skills in Mathematics.*” [Parent 13] Working on the computer, School subjects

Q6 *“They have used it in Mathematics and English (?) to support learning in these subjects, in the form of games.”* [Parent 16] School subjects, using games in lessons

5.3.2 Skills and competences

Skills and competences encompass three themes: Media education and social media, Purposeful use, clarity and limitations and the Diverse use of technology. The tone of these data extracts is generally positive and hopeful by nature. They focus on Questions 4 and 5, which question which kinds of skills are needed and why.

Q4. *“The advisable use is well-targeted, adequately critical, safe, fluent and supports the intended activity and is not oppressing/prevalent.”* [Parent 13] Purposeful use, clarity and limitations

Q5. *“In today’s world versatile media skills can be of good use in any kind of work.”* [Parent 10] Media education and social media

Q5. *“The fluent use is achieved by practicing and trying out, and it is important that the child can practice the safe use of different devices, programs, and learning and communication environments.”* [Parent 13] Diverse use of technology

As a result, it can be seen that parents give much thought to the underlying principles of using technology. ICT in learning should be purposeful, safe, and aim to use a variety of different digital tools in order for the student to gain a broad understanding. In addition, good ICT and media skills are seen to be universally transferable and beneficial in any field or work.

5.4 Relevant 21st century skills

Some of the 21st century skills become apparent from the data. The themes were formed on the basis of the framework of Binkley et al. (2009). This framework of 21st century skills encompassed four groups with a total of 10 skills which are the following:

Table 5. Framework of 21st century skills by Binkley et al. (2009)

<p>Ways of Thinking</p> <ol style="list-style-type: none"> 1. Creativity and innovation 2. <i>Critical thinking</i>, problem solving, decision making 3. Learning to learn, Metacognition
<p>Ways of Working</p> <ol style="list-style-type: none"> 4. <i>Communication</i> 5. Collaboration (teamwork)
<p>Tools for Working</p> <ol style="list-style-type: none"> 6. <i>Information literacy</i> 7. <i>ICT literacy</i>
<p>Living in the World</p> <ol style="list-style-type: none"> 8. Citizenship – local and global 9. <i>Life and career</i> 10. Personal & social responsibility – including cultural awareness and competence

The five most prevalent themes in this study were the following: 2. **Critical thinking**, problem solving, and decision making (Ways of Thinking) with an emphasis on the critical thinking, 4. Communication (Ways of working), 7. ICT literacy and 6. Information Literacy (Tools for working) and 9. Life & career (Living in the world). Thus, these five skills were examined on the basis that these appeared in the data collection. Some elements from the other five 21st century skills were visible in the data set (creativity, citizenship) to a lesser extent, while others were not mentioned at all. Consequently, those were not included in the study.

Two of the themes (Life & career, ICT literacy) had multiple subthemes, as they covered various aspects of the study. The remaining three themes (Communication, Information Literacy & Critical thinking) were not as extensive but could be defined in a more straightforward manner. As established earlier during the thematic analysis phase, the theme of

21st century skills was not introduced to the analysis process until later, because it emerged in the literature and previous studies when considering ICT in a holistic manner. The initial coding was named “Valuable skills”, therefore when redefining the theme as 21st century skills, it became more meaningful, clear and robust.

5.4.1 Life & career

The three subcategories for Life and career were: 1) Investment in future and employment, 2) ICT part of everyday life and 3) Need of skills in school. What made these themes special was that they could have easily been linked to some of the previous themes as well. Many of the parents mentioned that ICT skills were important for learning and future employment, and therefore these were also reasons to learn ICT. Furthermore, as it has been mentioned many times, ICT is part of our everyday life and thus, it could have been under the Changes caused by technology theme. But these data extracts shad more in common under this theme.

Question 5 Why are these ICT skills important

Q5 *“It is a requirement for work”* [Parent 12] Life & career, Investment in future and employment

Q5. *“They are needed for work, for hobbies and for studies.”*
[Parent 20] Life & career, need of skills in school

Q5 *“They are needed [skills] to get along independently in an information society”* [Parent 8] Life & career, ICT part of everyday life

Though it was mentioned earlier that Question 7 rarely resulted in longer responses, these two following data extracts are some of the few that elaborated in more detail about ICT in the future.

Q7. *“ICT skills are important and essential in work life and daily life, for there are many practical tasks which are taken care of in varying virtual environments. This may be emphasized in the future.”* [Parent 13] Life & skills, Investment in future and employment, need of skills in school

Q7 *“Versatile skills are surely needed for both degree studies and working.”*
[Parent 10] Life & skills, Investment in future and employment

Together these results provide important insights into the significance of ICT in many various aspects of life. Firstly, it is important on an individual level, to succeed in school and be proficient in life. Secondly, being competent in ICT is seen to have an impact on daily life considering one's family life, hobbies and studies - in other words, one's immediate surrounding environment. Lastly, these same ICT skills are thought to have an impact on employment and functioning in the larger society, i.e. being a good citizen.

5.4.2 ICT literacy

ICT literacy has been divided into digital literacy and digital fluency in this study. *Digital literacy* focused mainly on mechanical aspects of using digital tools, such as writing with word processors and touch typing and the technical use. This could also be described as the basics of computer sciences, or a starting point for many. It also addresses some of the school practices parents have experienced.

Q4. *"ICT skills include the TECHNICAL know-how of different devices, including the ability to use devices purposefully."* [Parent 13] digital literacy, technical use

Q6 *"Learning touch typing by using a program on the web."* [Parent 13] digital literacy, touch typing

Q6 *"they have written with a word processor"* [Parent 1] Digital literacy, writing with a word processor

Digital fluency centers on managing data, using the Internet as a tool and being fluent and reactive in relation to technology. It is also one viewpoint in defining ICT, as can be seen from the comments below.

Q3. *"All actions that happen on different devices and managing data."*
[Parent 7] Digital fluency, Managing data

Q3 *"Information technology, the Web and multimedia skills."*
[Parent 11] Digital fluency, Internet as a tool

In summary, these results show that the technical skills are highlighted, as well as skills to use devices fluently.

5.4.3 Communication

In this theme, parents primarily defined ICT as communication and it was also among the skills they considered important. This theme could have also been directly under defining ICT (as ICT is Information and *Communication* technology), but it was preferred to put here, as it formed a category of its own in 21st Century Skills. The following extracts focus on Question 3 “*What is information and communication technology (ICT) to your understanding?*” and Question 4 “*What kinds of ICT skills do you find important?*”

Q3. “*Technology and all technological devices, that enable communication, and the use of media content and data managing applications.*” [Parent 10]
Communication

Q3. “*Sharing information and communicating by means of technology. Other than oral communication.*” [Parent 2] Communication

Q3 “*All the devices and programs that enable one to communicate or participate*” [Parent 20] Communication

Q4. “*Technological skills and these days also critical evaluation of knowledge. Clarity and social skills, especially in communication.*” [Parent 7]
Communication

The results reveal two elements that are linked to communication: 1) technology is involved when communication and 2) social skills or participation are central. But a limitation of this theme is that it is still somewhat unclear what is meant by communication itself.

5.4.4 Information Literacy and Critical Thinking

These two themes are presented together, because they share commonalities considering which questions are addressed and both of them have to do with cognitive thinking skills. Both themes came up in relation to Questions 4 and 5 (*What ICT skills are important and Why*), which is visible in these following data extracts.

Q4) What kinds of ICT skills do you find important?

Q4. “*Good [ICT skills], the child can search for information and can use the most common programs*” [Parent 17] Working on the computer, Information literacy

Q4 *“--finding the most essential or needed information is emphasized, these days there is nearly an unlimited amount of information on any given topic, some of it is better, and some of it is worse, and some of that is absolutely incorrect information.”*

[Parent 2] Information Literacy

Q4. *“Using [ICT] and understanding information and being critical towards it.”*

[Parent 15] Critical thinking

Q4. *“Source criticism and information security, mastering different technologies.”* [Parent 8] Critical thinking

Q5) Why do you think these skills are important?

Q5. *“In all aspects and actions of the society, it is important for its citizens to be able to separate manipulation & disinformation from knowledge.”*

[Parent 18] Information Literacy

Q5. *“ICT skills are an essential part of life nowadays, but one has to remember what I already mentioned in my previous response: the appropriate use, an adequately critical approach and facilitating safe and supportive of activities–[ICT] should not be too prevalent.”* [Parent 13] Critical thinking

Q5. *“So one can form their own opinion based on objective information and they are not misled by so-called wrong information.”* [Parent 5] Critical thinking

Overall, these results indicate that parents are well aware of the dangers of using online environments, and that the information on the Internet can vary in its relevance and correctness. Therefore, they see that gaining a critical mindset and the skills to evaluate sources and information are essential competences for their children. In conclusion, there is an emphasis on how information is ranked or valued: some is valid information, some is not. In general, it is important to be aware and knowledgeable about what kind of information exists and the ability to prioritize or evaluate the relevance of knowledge is needed.

The results in this chapter indicate that there are many topics that parents are interested in, aware of and concerned about in view of ICT. The next chapter moves on to discuss the implications and general findings based on these results.

6 Discussion

This chapter serves to discuss the results presented in the previous chapter and introduce the findings of the study. There were three expectations I had stated for the study, which are the following 1) ICT can be defined in multiple ways, 2) ICT is identified as an important topic in general and 3) Parents are engaged in and concerned about their children's future and rely on the school to teach ICT actively. Out of these three hypotheses, the first two were linked to the first research question, (*RQ 1 How do parents define ICT*), while the last speculation was more connected to the second research question (*RQ 2 What are parents' perspectives on the use of ICT in the classroom?*). Thus, these hypotheses will be accordingly examined under each research question. A further aim of the study was to find out if the themes formed correlated with the learning objectives and the ICT aims of the Finnish curriculum, which will also be discussed under research question 1. Moreover, the findings will be reviewed in relation to previous research.

Research Question 1 How do parents define ICT

There were many ways parents defined ICT, and in the results, these were mainly divided into 1) Tools and practices 2) Skills and competences and 3) 21st century skills. Under these categories, some of the following themes were especially meaningful to parents: Communication, Digital fluency, Critical thinking, Information literacy, Devices and Diverse use of technology. The results also partially support Zuppo's (2012) definition which concluded that ICT in education is centered on three topics: "1) skills and competences, 2) devices/tools and 3) pedagogies." Out of these three, the first and second focus points, were clearly visible in the data. These were mainly things that the parents voiced out and how they defined ICT. The third focus point (pedagogies) is not prevalent in the data. It is of course natural that the parents would not know about pedagogies, as teachers are the ones to plan and implement the methods used for teaching. But that raises the question of whether the parents should know more about pedagogies and be involved in planning teaching to some extent despite that fact that teachers may be considered the educational professionals. And furthermore, this finding could imply that there is a need to train or educate parents and teachers collaboratively about ICT pedagogies, which are used both in school and at home. There have been many attempts to

educate teachers (as it is a natural part of their professional growth) but educating parents may be found inconvenient.

Surprisingly, social media and future employment prospects were also central themes. While doing the thematic analysis, it felt peculiar that specifically employment was such a significant topic for many primary school parents - as their children are still relatively young. But on the other hand, parents are likely to worry about the future and the legacy they will be leaving their children and how their children will survive in this ever-changing and complex world. Social media and social networking on the other hand play a central part in youth culture and the everyday life of children, but I had not considered how it is present in school. In the Introduction of "*Uusi koulu: Oppiminen mediakulttuurin aikakaudella*" [Eng. New school, Learning in the Era of Media Culture], Pohjola (2011) suggests that "*media culture is the central environment children and young people learn and grow up in.*" Consequently, this could point to schools needing to implement change that would bring school practices closer to the everyday life of young people.

Turning now to my second expectation for the study (*ICT is identified as an important topic in general*), this was generally confirmed throughout the results by the majority of parents. Some of the reasons why it is important is because ICT skills are needed in every instance of life (hobbies, school, work, leisure) and it is also vital for functioning in society i.e. ICT as a civic skill. The only slightly opposing opinions voiced out that ICT should not replace traditional ways of learning or become too controlling or important.

The themes of *Information literacy* and *Purposeful use, clarity and limitations* were also significant to some of the parents. The vast amount of information available online could imply, that perhaps a teacher would not need to be too knowledgeable about online content themselves (because parents can independently search for information themselves), but Masters (2015) suggests otherwise and that is what the results also indicated to some extent. Masters (2015) presents that teachers should be educated to use online environments and computers purposefully. A teacher should be very decisive and informed about the materials that they use, how the materials are suitable for the age group they are teaching, and keep in mind the cultural aspects as well as quality and if the materials are linked to any commercial objectives. In addition, teachers should also help parents navigate through online environments and offer recommendations on beneficial materials. (Masters, 2015)

On the other hand, this seems like common sense, firstly, because a teacher may be more knowledgeable through their profession and should attempt to grow in their expertise. Secondly, a teacher has to take into consideration many factors when they are planning lessons, and always has to evaluate as well as appropriate their teaching to the class they are working with. Lastly, teachers have been traditionally seen as torchbearers and thus, should lead the way in safe and useful ICT practices. This combination of findings provides some support for the conceptual premise that teachers collaborating with parents is the key to successful learning of ICT and using online environments in an appropriate and adequate manner.

Using the framework of Epstein (2009) could provide useful practical actions for this purpose. The framework was mentioned in section 3.1.1. The following are examples on how to apply Epstein's framework to the context of ICT.

- 1) **Parents would be supported** in creating an enabling environment - also considering the use of technology at home
- 2) **enhanced communication** between teachers and parents on the used practices of ICT at both school and home, and how students are advancing and using technology
- 3) **volunteering**, getting parents to help, considering ICT (e.g. parents who are game-developers or ICT specialists could teach about their field)
- 4) **broadening learning** out of the classroom and **extending it to practices at home**, and offering families resources, also using e.g. flipped classroom practices
- 5) involving parents in the **decision-making process** - why not also when considering what technology to invest in for the school and
- 6) **collaboration with the community** - considering the future of the school and the changes to come, the concept of the school will be transformed to facilitate learning and offer services on multiple levels to all community members. (Piispanen, 2008; Välijärvi, 2011; Pohjola, 2011, Epstein, 2009).

This of course opens a whole new set of questions; if a student plays an extensive amount of video games at home, would that be considered ICT? Is it possible that students could use a whole day at school watching videos and doing group work without the teacher actively teaching? What if a student writes a blog or manages a YouTube channel avidly for the school and the parents disapprove of that kind of action? Though it is impossible to guess all the

outcomes, or even attempt to address all the arising issues, it is good to remember that the aim of implementing new technology-enhanced practices is to open new opportunities and prepare students for the future.

Reviewing the themes from the perspective of the Finnish curriculum

As stated in the beginning of this chapter, one aim of this study was to find out if the themes were linked to the Finnish national curriculum considering ICT and to what extent this happens. The four main objectives of ICT as a transversal competence are the following:

- 1) students understand the main principles of ICT and learn how to use technology not only in general, but also for creative purposes
- 2) facilitating the learning of safe, ergonomic and responsible use of ICT
- 3) students learn to manage data by using ICT and can also make good use of it during inquiry-based and creative working
- 4) *“Students gain experience and practice using ICT in communicating and networking”* (Finnish National Board of Education, 2014 p.23)

Comparing these objectives to the results, several themes from the study can be pinpointed to each objective accordingly:

- 1) ICT is essential for all, emerging technological practices, ICT literacy, devices, diverse use of technology
- 2) The safe use of technology (Concerns), Purposeful use, clarity and limitations, Critical thinking
- 3) Pervasive technology requires adaptation, Information literacy, ICT literacy, working on the computer
- 4) media education and social media, communication

In conclusion, this serves to prove that parents indeed seem to be aware of the same ICT objectives which were mentioned in the curriculum. Furthermore, most parents are relatively aware of ICT practices in the school - apart from the few individuals who were inexperienced. Parents voiced out their opinions on how the school is “doing their job” to some extent, but it was not a prevalent theme. What makes these findings interesting is that the themes discussed

in the study are more extensive than in the curriculum. This could point to the need of establishing ICT as a self-standing school subject to cover the multitude of ICT adequately and in addition or alternatively, parents have higher expectations of what the school can offer than what is realistic. There is some evidence which points to the later implication. In the study of Roncevic et al. (2016), parents whose children did not use tablets in the classroom, or were beginning to use tablets, had higher expectations about the benefits to be gained by using than those parents whose children were already using tablets for schoolwork. Though, the latter group was more aware of both the limitations and strengths of using such devices.

Research Question 2 What are parents' perspectives on the use of ICT in the classroom?

In general, parents described school practices and activities to some extent. The responses were mainly focused on games to support learning, online learning environments and the use of computers or other devices in a purposeful manner. Overall, devices and computers are significant and are often seen as the face of ICT. But often ICT is still mostly limited to the use of existing digital tools, instead of building and creating i.e. the active use of technology or using it for creative purposes, which would point to computational thinking. Emerging technological practices, such as programming, coding, 3D-modelling etc. were not prevalent in the data, but were still mentioned. These results provide some support for the finding of Hakkarainen et al. (2000) that ICT is not used so much in schools as it could be, despite Finland being considered a technologically advanced country.

Returning to my third speculation (*Parents are engaged in and concerned about their children's future and rely on the school to teach ICT actively*), this was somewhat confirmed in the data. The results of this study indicate that parents are aware of what ICT is, what future implications it can bring and some were interested in learning more about ICT - especially if it was an unfamiliar concept. Parents had various concerns regarding ICT: that it is not taught enough in schools, that there are various online threats and furthermore they expressed that their own inexperience - or the inexperience of the teacher - can impede learning, because technology changes rapidly and it requires effort to keep up with the pace.

The role or the tasks of the school considering ICT were not discussed much, but that can be considered unsurprising as the questionnaire was focused more on existing practices and how parents defined ICT. Therefore, the latter part of my last hypothesis “[parents] rely on the

school to teach ICT actively” was unsupported. Only a few comments were made on 1) when to start learning ICT (Starting early vs. later) and 2) the inexperience of teachers and parents. Having a neutral attitude towards the use of ICT in education can also be confirmed by Baytak, Akbiyik & Usak (2012). On that note, another finding which emerged, was that the school practices described by the parents complied largely with definitions they provided. In other words, the responses often tended to echo what had already been said in the definition.

The findings in this report are subject to at least three limitations. First, one limitation of the study is the geographical Oulu region. The study may have produced more extensive findings had there been a comparative study with another region in Finland (i.e. Turku or Jyväskylä), or compared to another school from abroad, like Sweden for example. That is something to consider for future research. Secondly, the focus was on primary school parents with children in grades 1 through 6, therefore it did not take into consideration early childhood education or secondary school contexts. Lastly, because changes in ICT happen so rapidly, it could have been interesting to implement longitudinal research, for example considering how these parents view ICT in a year or two from now. In that case, the chosen data collection method would have had to be entirely different, to ensure the participants would be the same.

7 Conclusion

The objective of this study was to investigate how parents define Information and Communication technology and what practices related to ICT they have indirectly experienced to be used at school. Furthermore, the future of school and the definition of ICT was thoroughly discussed as well as ICT objectives from the Finnish curriculum. This study has raised important questions about the nature of ICT, and how it has already changed our everyday lives and how it will continue to change our lives and surrounding environments and communities.

The contribution of this study has been to identify the reasons and underlying factors of why parents think ICT is important in and outside the classroom. Perhaps the three most significant reasons voiced by parents were the following: 1) children need to gain skills and competences to work proficiently in both online and offline digital environments, 2) learning the safe, purposeful and diverse use of technology can help avoid some of the problems brought by technology and 3) ICT is pervasive in every walk of life, and therefore requires adaptation. Furthermore, the descriptions of what practices were used in the school varied from “little to no existing ICT teaching” to emerging technological practices. In general, the most common practices were the following: working on the computer, ICT in different school subjects and learning to utilize online environments and games, as well as mastering social media and other media skills. On a larger scale, the focus still remains on digital literacy and fluency, instead of computational thinking.

To conclude the main findings: 1) There are many ways to define ICT, and parents mainly defined it as communication, digital fluency, critical thinking, information literacy, skills and devices i.e. hardware. In addition to the themes the parents voiced out, the educational context also takes pedagogies into consideration when defining ICT. 2) Parents are relatively aware of the aims of ICT presented in the curriculum. 3) Parents have many expectations for ICT in the future (including employment prospects), but few still express their concern that there is little ICT in teaching, or that it should not be too central. 4) Because of the changes in society and at school, it is recommended that educators both at home and at school collaborate more efficiently. 5) School practices vary a lot, from emerging technological practices (programming, 3D-modelling) to using online environments and games to learning the basics of use of computer, i.e.. digital literacy. Further research is recommended to find out if ICT

should be a standalone school subject. Lastly, the perhaps most significant finding of this study is that learning ICT skills are perceived mostly beneficial in all sectors of life and for the future, when applied adequately.

This study was limited by focusing solely on parents, the primary school (grades 1 to 6) as well as centering on the Finnish school perspective. Since the study was limited to these topics, and considering the scope of an average master's thesis, it was not possible to delve deeper into the themes. Though these limitations could also be considered as key strengths of the present study, because it enabled to go deeper in the main themes. It is recommended that further research be undertaken in the following areas: doing international comparative research, longitudinal research, or examining ICT with a certain perspective of the emerging technological practices in mind, such as robotics, programming or 3D-modelling. In addition, a further study could investigate how parents could be involved as active partners in learning about ICT. It can be assumed that the significance of parents considering education will only increase in the future.

Taking into account my personal goals considering this study; though I didn't gain much insight of the practical side of being a teacher, my understanding of parents and the diversity of ICT in education definitely increased. Furthermore, I learned much about doing, planning and implementing research, which in itself is a valuable set of skills and can provide to be useful also when working as a teacher in the educational field. And finally, already during this journey I have encountered many others (teachers and parents alike) interested in the results of this study.

Looking back to the lessons learned, firstly, the data collection process took more time than evaluated at first because of the research permission. Hence, in the future I should think or try to find out in advance if there is need for a research permission. Secondly, there can always be further refining of the data collection questions. An example of this is when respondents did not often elaborate much on question 7 "*How do you see the importance of ICT skills in the future?*" The answers varied from not too important (compared to the current situation), to extremely significant. It would have required a follow-up question or simply a more specific question for the answers to be more elaborated. Unfortunately, the test-sampling phase did not reveal this deficiency. Once again, this is a limitation of using the chosen method to collect data. In general, making the decision about which method to use should be deliberated with care.

Lastly, doing thematic analysis with NVivo 12 was fascinating and engaging. Using the program brought clarity and focus to the themes. I was satisfied with my decision to put effort into learning the program. But on the other hand, sometimes I had to sketch out my thoughts on paper as well, to understand the relationships between the themes. I was still learning how to use the software, and therefore I was not aware of all the functions that could have been useful for the analysis. Moreover, doing the analysis thoroughly also demanded time and awareness, as well as constant documentation about what I was doing.

All in all, this study opened up a new set of questions, considering the role of the parent in education and how to involve both them and teachers in learning new ICT skills, or how to increase their awareness considering ICT. Moreover, should ICT be a self-standing school subject in the future school, or is it sufficient as a transversal competence? Will technology take over our lives too much and dictate the course of our everyday lives, or will we learn to use ICT to our advantage and think critically about what we are doing in relation to it? These are big questions, which can be answered through many perspectives. In conclusion, there is always something intriguing to be researched.

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Appendix 1

KYSYMYKSET

VASTAUKSET

20

Osio 1/5

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⋮

Pro Gradu kysely 2019

Olen Minna Kantola, ja opiskelen luokanopettajaksi Oulun yliopistossa.
Tutkin Pro gradussani vanhempien näkökulmia tieto- ja viestintäteknologian (TVT) käytöstä koulussa.

Kyselyn vastaamiseen on kolme kriteeriä:

- 1) sinulla on yksi tai useampi lapsi alakoulussa, eli luokilla 1-6.
- 2) et itse työskentele kasvatus- tai opetusalan tehtävissä
- 3) asut Oulun seudulla

Vastaamalla tähän kyselyyn annat suostumuksesi käyttää vastauksiasi Pro Gradu -tutkielmassa. Kerättyä aineistoa käytetään vain tutkimustarkoituksiin. Kyselyyn vastaamiseen on hyvä varata aikaa 10-20 min.

Perustiedot

Huom! Muista painaa aivan kyselyn loppuksi SUBMIT, jotta lomake tallentuu.

1) Millä luokalla/ luokilla lapsesi tai lapsenne ovat? *

☐ [1.lk](#)

☐ [2.lk](#)

☐ [3.lk](#)

☐ [4.lk](#)

☐ [5.lk](#)


☐ [6.lk](#)

2) Millä alueella lapsesi tai lapsenne käyvät koulua (esim. Haukipudas/ Keskusta) *

Oma vastauksesi

[Takaisin](#)

[Seuraava](#)

 Sivu 2 / 5

Tieto- ja viestintäteknologia yleisesti

3) Miten ymmärrät käsitteen tieto- ja viestintäteknologia (TVT)? *

Oma vastauksesi

4) Millaiset TVT taidot ovat mielestäsi tärkeitä? *

Oma vastauksesi

5) Miksi nämä TVT taidot ovat mielestäsi tärkeitä? *

Oma vastauksesi

Takaisin

Seuraava

Sivu 3 / 5

TVT koulussa ja tulevaisuudessa

6) Anna esimerkki koulun TVT opetuksesta, mitä olet kuullut lapseltasi tai lapsiltasi. *

Oma vastauksesi

7) Millaisena näet TVT taitojen merkityksen tulevaisuudessa? *

Oma vastauksesi

Takaisin

Seuraava

Sivu 4 / 5

Pro Gradu kysely 2019

*Pakollinen

Muut asiat

Tänne voit kirjoittaa muita mieleen tulevia asioita/ palautetta *

Oma vastauksesi

Jos haluat tietää tutkimuksen tuloksista, voit kirjoittaa sähköpostiosoiteesi tähän.

Oma vastauksesi

Takaisin

Lähetä

Sivu 5 / 5